

Work Order ID 59002

Friday, May 21, 2010 8:52:07 AM



Page 1

Item ID: D205-634-041

Accept



Setup Start



Revision ID:

Item Name: Replacement Skidtube

Stop



Start Date: 5/21/2010 Start Qty: 1.00



Cust Item ID:

Required Date: 5/31/2010 Req'd Qty: 1.00



Customer:

Reference:

Approvals:

Process Plan:

PS

Date: 10-5-21

Tooling:

Date:

Run Start



QC:

Date:

SPC (Y/N):

Date:

Stop



Sequence ID/
Work Center ID

Operation
Description

Set Up/
Run Hours

Draw
Number

Draw
Rev.

Plan
Code

Accept
Qty

Reject
Qty

Reject
Number

Insp.
Stamp

Draw Nbr

Revision Nbr

D2580

Rev D

100

0.00



DC

DOCUMENT CONTROL

Memo

0.00

Document Control

Photocopy D205-634 bluefile & type labels per PPP D205-634-041 CHG002

8/10/06/09 *for BG 10/06/03*

110

0.00



CNC Bend 1

BENDING MACHINE - SKIDTUBES

Memo

0.00

CNC Delta 100 Bender

1-Bend as per program D2580.C on CNC Bender and Folio FT009

2-Cut tubes as per Dwg. D2580

11/10/15/26

59002

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
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Run Start



QC: _____ Date: _____ SPC (Y/N): _____ Date: _____

Stop

Sequence ID/
Work Center IDOperation
DescriptionSet Up/
Run HoursDraw
NumberDraw
Rev.Plan
CodeAccept
QtyReject
QtyReject
NumberInsp.
Stamp

120

0.00



Skidtubes

Memo

0.00

Skidtubes

1- Deburr ends

2- C'sink holes as per dwg without cutting fluid

3- Prepare tube for welding, remove alodine as required.

4- Scribe batch number insied aft end of tube.

H 6/5/26

130

QC5- Inspect part completeness to step on W/O

0.00



QC

Memo

0.00

Quality Control

BE (X) 10/05/31

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Run Start



Stop



Sequence ID/
Work Center ID

Operation
Description

Set Up/
Run Hours

Draw
Number

Draw
Rev.

Plan
Code

Accept
Qty

Reject
Qty

Reject
Number

Insp.
Stamp

140

0.00



Skidtubes

Memo

0.00

Skidtubes

1-Weld step D2576 as per Dwg. D2580 and QSI 004

A/R□□□ Aluminum Rod

M112860

BE 10/05/31

2-Prep per QSI 005 and weld crossbolt spacers D2579 as per Dwg. D2580, QSI 004.

For D2579 spacers, weld one side, pass 3/8" drill, weld other side, pass 3/8" drill

A/R□□□ Aluminum Rod

M112860

BE 10/05/31

3-Grind welds as per Dwg D2580 Grind flush ridge made from bending

4-Drill holes for wearplates using DT 8217 & DT8937 Open holes to 19/64" adjust stopper not to hit web. Debur

5-Counterbore crossbolt spacers to 7/16" ID x 1.0" deep as per Dwg D2580. Debur holes

6-Drill pilot holes for aft cap using DT 8215 Open holes to 0.208". Debur

7-Drill pilot holes for Tow ring using DT8091, open to .640" and Debur

AWM 10-5-31

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QC: _____ Date: _____ SPC (Y/N): _____ Date: _____

Stop

Sequence ID/
Work Center IDOperation
DescriptionSet Up/
Run HoursDraw
NumberDraw
Rev.Plan
CodeAccept
QtyReject
QtyReject
NumberInsp.
Stamp

150

QC10- Inspect visual per QSI004- ground welds

0.00



QC

Memo

0.00

8/10/10

Quality Control

160

QC5- Inspect part completeness to step on W/O

0.00



QC

Memo

0.00

8/10/10

Quality Control

170

Pressure Wash per QSI005 4.3

0.00



HandFinish

Memo

0.00

Hand Finishing

Re-alodine tube as per QSI 005 section 4.1.2.1 do not acid etch and leave fwd cap out of solution.

① BK 106-1

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Run Start

Stop

Sequence ID/
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DescriptionSet Up/
Run HoursDraw
NumberDraw
Rev.Plan
CodeAccept
QtyReject
QtyReject
NumberInsp.
Stamp

180



Powdercoat

Powder Coating

White Gloss(Ref:4.3.5.1) per QSI005 4.3-Alum

0.00

M114207

E) Jell 10/06/01

Memo

0.00

START TIME:

8:30 AM

OVEN TEMPERATURE:

320°

FINISH TIME:

9:00 AM

1 0/

190



QC

Quality Control

QC3- Inspect Part Finish

0.00

Memo

0.00

1 BR 10-6-3

W/O:		WORK ORDER CHANGES					
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QC: _____ Date: _____ SPC (Y/N): _____ Date: _____

Run Start



Stop

Sequence ID/
Work Center IDOperation
DescriptionSet Up/
Run HoursDraw
NumberDraw
Rev.Plan
CodeAccept
QtyReject
QtyReject
NumberInsp.
Stamp

200

0.00



HandFinish

Memo

0.00

Hand Finishing

1-Install inserts & wearplates & Gaskets as per Dwg. D2580. Use a drop of
Sikaflex on insert holes before installing wearplates
A/R ☐☐☐ Sikaflex-291 11/13/05
Sikaflex expire date: 10/11

2-Coat D2594-3 O' rings with Petroleum Jelly and install on D2594-1 plugs as
per Dwg D2580

3-Inspect for foreign object per QSI 024

4-Install 2855 Aft Cap as per Dwg D2580 and seal Fwd Step & Aft Cap with
Sikaflex. Clean excess adhesive
A/R ☐☐☐ Sikaflex-291 11/13/05
Sikaflex expire date: 10/11

5-Wing Walk as per Dwg D2580 and QSI 005 4.4
Batch: 114432

① bl 106-3.

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Reference:

Approvals: Process Plan: _____ Date: _____ Tooling: _____ Date: _____
QC: _____ Date: _____ SPC (Y/N): _____ Date: _____

Run Start



Stop

Sequence ID/
Work Center IDOperation
DescriptionSet Up/
Run HoursDraw
NumberDraw
Rev.Plan
CodeAccept
QtyReject
QtyReject
NumberInsp.
Stamp

210

QC5- Inspect part completeness to step on W/O

0.00



QC

Memo

0.00

Quality Control

Inspect Aft Cap, Fwd Step and Wing Walk of work to Current Step Inspect for Foreign objects per QSI 024

220

Packaging

0.00



Packaging

Memo

0.00

Packaging

Identify and pack for shipping as per PPPD205-634-041

Location:

PPP Rev: M

230

QC21- Final Inspection - Work Order Release

0.00



QC

Memo

0.00

Quality Control

Signature
10/06/10

Signature
10/06/10
MF
10-6-10

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 IPP Rev P 10.02.19 per PAR09-043 EC verified by:DD
 IPP Rev. O 06.02.28 Added paperwork EC
 IPP Rev:P 07-07-09 SS Wearplates & Gaskets JLM

Start Date: 5/21/2010

Required Date: 5/31/2010

Start Qty: 1.00

Required Qty: 1.00

D2580-1 Manufactured No 110 Each 8.0000 1 1
 205 Skidtube bent detail
 13 58 747 ① M 10/5/26

Location	Loc Qty	Loc Code
LG	8	
57028	1	
58112	1	
58384	1	
58385	1	
58618	2	
58619	2	

D2576-3 Manufactured No 140 Each 101.0000 1 1
 Step (maching detail)

Location	Loc Qty	Loc Code
LG	101	
46661	53	
52215	48	

D2579 Manufactured No 140 Each 13.0000 20 20
 Crossbolt Spacer

Location	Loc Qty	Loc Code
LG	13	
57052	5	
57348	8	

858433

②20

BE 10/05/31

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Start Date: 5/21/2010

Required Date: 5/31/2010

Start Qty: 1.00

Required Qty: 1.00

D2855 Manufactured No 200 Each 100.0000 1 1



Cap

Location	Loc Qty	Loc Code
FP6	2	
56613	2	
ST026	98	
50513	1	
50770	28	
51539	16	
53791	53	

1 BR 10-6-3

AN3-5A Purchased No 200 Each 953.0000 2 2



Bolt

Location	Loc Qty	Loc Code
ST350	953	
105057	953	

2 BR 10-6-3

AN960JD10L NAS1149D0332J Purchased No 200 Each 4,015.000 2 2



Washer

Location	Loc Qty	Loc Code
ST348	4015	
110985	4015	

2 BR 10-6-3

ALS7-1032-130 Purchased No 200 Each 17.0000 50 50



Insert

ALS4-1032-130

Location	Loc Qty	Loc Code
ST282	17	
113238	17	

50 BR 10-6-3

Friday, May 21, 2010 8:52:12 AM

Shop Packet Print

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Start Date: 5/21/2010

Required Date: 5/31/2010

Start Qty: 1.00

Required Qty: 1.00

AN3C4A	Purchased	No	200	Each	1,289.000	50	50
BOLT							

Location	Loc Qty	Loc Code
ST350	1289	
114103	501	
114108 ✓	300	
114416	12	
114523	476	

50 BR 10-6-3

AN960C10L	NAS1149C0332 R	Purchased	No	200	Each	0.0000	50	50
washer								
D3566-13								
Gasket								

NAS1149C0332 R.

114346

50 BR 10-6-3

Location	Loc Qty	Loc Code
FP	28	
53461 ✓	28	

1 BR 10-6-3

D3566-5	Manufactured	No	200	Each	16.0000	1	1
Gasket							

Location	Loc Qty	Loc Code
FP015	16	
57682 ✓	16	

1 BR 10-6-3.

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Start Date: 5/21/2010

Required Date: 5/31/2010

Start Qty: 1.00

Required Qty: 1.00

D3566-1	Manufactured	No	200	Each	31.0000	2	2
Gasket							

Location	Loc Qty	Loc Code
FP015	31	
57715	10	
58182 ✓	21	

2 BR 10-6-3

D3564-11	Manufactured	No	200	Each	4.0000	1	1
Wearshoe							

Location	Loc Qty	Loc Code
FP019	4	
57957	4	

1 BR 10-6-3

D3564-13	Manufactured	No	200	Each	22.0000	1	1
							
Wearshoe							

Location	Loc Qty	Loc Code
FP17	22	
57684 ✓	8	
57922 ✓	14	

1 BR 10-6-3

D3564-9	Manufactured	No	200	Each	17.0000	1	1
Wearshoe							

Location	Loc Qty	Loc Code
FP	1	
55334	1	
FP019	16	
57685	2	
57958 ✓	14	

1 BR 10-6-3

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 IPP Rev:P 07-07-09 SS Wearplates & Gaskets JLM

Start Qty: 1.00

Required Qty: 1.00

D3564-5 Manufactured No 200 Each 24.0000 1 1
 Wearshoe

Location	Loc Qty	Loc Code
FG	1	
34806	1	
FP19	23	
57525	1	
58709 ✓	22	

1 BL 10-6-3

D2594-3 Manufactured No 200 Each 327.0000 16 16
 O-Ring, 205 Skidtube

Location	Loc Qty	Loc Code
FP	327	
55546	19	
58191 ✓	308	

16 BL 10-6-3

D2594-1 Manufactured No 200 Each 518.0000 16 16
 Plug, 205 Skidtube

Location	Loc Qty	Loc Code
FP	334	
42807	112	
55002	80	
57826 ✓	142	
FP14	184	
58434	184	

16 BL 10-6-3

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DART

DESIGN <i>[Signature]</i>	DRAWN BY <i>[Signature]</i>	DART AEROSPACE LTD HAWKESBURY, ONTARIO, CANADA	
CHECKED <i>[Signature]</i>	APPROVED <i>[Signature]</i>	DRAWING NO. D2580	REV. D SHEET 1 OF 3
DATE 07.02.27		TITLE 205 SKIDTUBE ASSEMBLY	SCALE NTS
A	96.09.16	NEW ISSUE	
B	96.12.02	AS MANUFACTURED	
C	98.08.26	REDRAWN, INCLUDED DEO 9094/9097	
D	07.02.27	CHANGE TO SS WEARPLATES AND GASKETS, INCLUDE DEO 9124/9183	

RELEASED
07-06-28 *[Signature]*

QTY -041	QTY -045	Part Number	Description
X		D2580-041	SKIDTUBE ASSEMBLY
	X	D2580-045	SKIDTUBE ASSEMBLY
1	1	D2500-1-190	EXTRUSION
1	1	D2576-3	STEP
20	24	D2579	CROSS BOLT SPACER
16	16	D2594-1	PLUG
16	16	D2594-3	O-RING
1	1	D2596	205 WEB
1	1	D2855	AFT CAP
1	1	D3564-5	WEARSHOE
1	1	D3564-9	WEARSHOE
1	1	D3564-11	WEARSHOE
1	1	D3564-13	WEARSHOE
2	2	D3566-1	GASKET
1	1	D3566-5	GASKET
1	1	D3566-13	GASKET
50	50	ALS7-1032-130 or AKS7-1032-130 or AKS4-1032-130 or AELS-1032-130	INSERT
50	50	AN3C4A	BOLT
2	2	AN3-5A	BOLT
50	50	AN960C10L	WASHER
2	2	AN960JD10L	WASHER

SHOP COPY
RETURN TO
ENGINEERING
UNCONTROLLED COPY
SUBJECT TO AMENDMENT
WITHOUT NOTICE
WORK ORDER
NO. 59002
Ref 10-5-21

GENERAL NOTES:

- 1) TOLERANCES ARE PER DART QSI 018 UNLESS OTHERWISE NOTED
- 2) ALL DIMENSIONS ARE IN INCHES
- 3) INSERT D2596 WEB TO LOCATION SHOWN OFF AFT END OF SKIDTUBE AND BOND WEB INTO OUTER TUBE WITH NON-STRUCTURAL SIKAFLEX-241 ADHESIVE PER DART QSI 015 BEFORE BENDING. ENSURE HOLES LINE-UP.
- 4) BEND AS A SMOOTH RADIUS STARTING WITH A MAXIMUM CENTERLINE RADIUS OF 60 AND ENDING WITH A MINIMUM RADIUS OF 30. A MAXIMUM REDUCTION OF 0.200 IN DIAMETER IS ALLOWABLE IN THE BENT PORTION OF THE TUBE.
- 5) USE DART DRILL TEMPLATE TD2577-205 TO LOCATE AND DRILL Ø0.297 HOLES FOR WEARSHOE INSERTS. INSTALL ALS7-1032-130 PER SECTION D-D (50 PLACES) AFTER FINISH. INSTALL AN3C4A BOLTS AND AN960C10L WASHERS WITH SIKAFLEX-241/-291.
- 6) WELDING TO BE DONE PER DART QSI 004.
- 7) FINISH:
SEE NOTES ON
PAGE 2 FOR D2580-041 AND
PAGE 3 FOR D2580-045
- 8) INSERT D2594-1 PLUG C/W D2594-3 O-RING IN HOLES MARKED 'P' (BOTH SIDES OF TUBE) AFTER FINISH (16 PLACES).

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W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

NOTE: Date & initial all entries

RELEASED
07-06-28-11

Diagram illustrating the grinding locations for the propeller cross-section:

- GRIND FLUSH (4 PLACES)
- GRIND FLUSH
- D2576-3 STEP
- LOCATION RIDGE ON UNDERSIDE OF D2576

Ø0.208

DRILL PRIOR TO D2855 CAP
INSTALLATION (2 PLACES)

SEAL WITH
SIKAFLEX-241/-291

AN3-5A BOLT (1)
AN96QD10L WASHER (1)
(2 PLACES)

D2855 CAP

0.40

Diagram illustrating the assembly of the D2579 Spacer. The assembly consists of a central web (D2596 WEB (REF)) and a spacer (D2579 SPACER). The spacer is inserted into the web, and the assembly is performed after drilling and bending. The following steps are required:

1. CHAMFER HOLE $0.050 \times 45^\circ$
2. INSERT D2579 SPACER (20 PLACES)
3. WELD INTO PLACE AND GRIND FLUSH
4. C'BORE D2579 SPACER TO 0.437×1.00 DEEP

Additional callouts include: ALS7-1032-130 (REF) (TYP 50 PLACES) and a note indicating 50 PLACES.

[illegible]

UPPER ASSEMBLY DETAIL

WELD AS PER DETAIL B

BLACK ANTI-SKID TO 0.5 ABOVE LOCATION RIDGE

BLACK ANTI-SKID TOP OF STEP TO 0.5 ABOVE BOTTOM EDGE

0.5

1.5

1.5

8

P P P P P P P

REFER TO DETAIL C

D3566-1

D3566-5

D3566-13

D3564-11

D3564-5

D3564-9

D3564-13

AN3C4A BOLT (1)

AN960C10L WASHER (1)

(50 PLACES)

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i) FINISH: ACID ETCH, ALODINE PER DART QSI 005 4.1 PRIOR TO INSERTING D2596 WEB
POWDER COAT ASSEMBLY GLOSS WHITE (REF. 4.3.5.1) PER DART QSI 005 4.3
BLACK ANTI-SKID PAINT AS INDICATED PER DART QSI 005 4.4

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REV. D
SHEET 2 OF 3
SCALE
1:24

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
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			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

NOTE: Date & initial all entries

RELEASED
07-06-28

Diagram illustrating the grinding locations on the propeller hub:

- GRIND FLUSH (4 PLACES)
- GRIND FLUSH
- D2576-3 STEP
- LOCATION RIDGE ON UNDERSIDE OF D2576
- GRIND FLUSH

Technical drawing of a circular component, likely a cap or cover, showing various fasteners and dimensions. The drawing includes the following labels and dimensions:

- #0.208**: Dimension for the hole diameter.
- DRILL PRIOR TO D2855 CAP INSTALLATION (2 PLACES)**: Instruction for drilling two holes.
- D2855 CAP**: Label for the cap being installed.
- AN3-5A BOLT (1)**: Label for one of the bolts.
- AN960JD10L WASHER (1)**: Label for one of the washers.
- (2 PLACES)**: Dimension for the distance between the two bolt/washer locations.
- SEAL WITH SIKAFLEX-241/-291**: Instruction for sealing the component.
- SEE NOTE ii)**: Reference to a note.
- 0.40**: Dimension for the thickness of the component.

Diagram of a circular web assembly. Labels point to various components: D2579 SPACER (top), D2596 WEB (REF) (left), and ALS7-1032-130 (REF) (TYP 50 PLACES) (bottom left). A callout box on the right contains a list of instructions.

5

D2579 SPACER

D2596 WEB (REF)

ALS7-1032-130 (REF)
(TYP 50 PLACES)

AFTER DRILLING AND BENDING ASSEMBLY
PERFORM THE FOLLOWING FOR #0.508 HOLES ONLY:

1. CHAMFER HOLE 0.050 x 45°
2. INSERT D2579 SPACER (20 PLACES)
3. WELD INTO PLACE AND GRIND FLUSH
4. C'BORE D2579 SPACER TO #0.437 x 1.00 DEEP

AFTER DRILLING AND BENDING ASSEMBLY
PERFORM THE FOLLOWING FOR #0.508 HOLES ONLY:

1. CHAMFER HOLE 0.050 X 45°
2. INSERT D2579 SPACER (20 PLACES)
3. WELD INTO PLACE AND GRIND FLUSH
4. C'BORE D2579 SPACER TO #0.437 X 1.00 DEEP

- i) FINISH: ACID ETCH, ALODINE PER DART QSI 005 4.1 PRIOR TO INSERTING D2596 WEB POWDER COAT ENTIRE ASSEMBLY GREEN (REF. 4.3.5.8) PER DART QSI 005 4.3 BLACK ANTI-SKID PAINT AS INDICATED PER DART QSI 005 4.4
- ii) IT IS ACCEPTABLE TO GRIND A RELIEF IN THE D2855 AFT CAP TO PREVENT INTERFERENCE WITH THE SPACER AT THIS LOCATION

37.50
DISTANCE TO AFT END
OF D2596 WEB

3
7

1.750 1.750

Ø0.508 (TYP.)
(40 PLACES)

REFER TO DETAIL E

REFER TO DETAIL A

8.750
17.375
26.000
34.188

57.313 (REF)
7 EQUAL SPACES
8.188 PITCH

38.0 91.500

190.0
(D2500-1)

Figure 1 is a plan view of the proposed road layout. It shows the alignment of the road, the location of the existing road, and the proposed road. The diagram includes dimensions for the road width, the distance between the road and the existing road, and the location of the road relative to the existing road. Key dimensions include 51.340, 39.580, 5.985, 5.338 (REF), 3.630 (REF), 5.915, 0.508 (8 PLACES), 20.0, 0.640, 1.4, 1.0, 13.4, 32.0 ± 1.0, and 11.0. A note indicates "DISTANCE BETWEEN HOLE AND TANGENT POINT" for two locations.

0.5

1.5

1.5

H

REFER TO DETAIL G

NO C'BORE
NO PLUG

BLACK ANTI-SKID TO 0.5
ABOVE LOCATION RIDGE

NO C'BORE
NO PLUG

8

1.5

1.5

1.5

WELD AS PER DETAIL F

BLACK ANTI-SKID TOP OF STEP
TO 0.5 ABOVE BOTTOM EDGE

P P P P P P P P

H

NO C'BORE
NO PLUG

D3566-1

D3566-5

D3566-1

D3566-13

D3564-11

D3564-5

D3564-9

D3564-13

AN304A BOLT (1)
AN960C10L WASHER (1)
(50 PLACES)

DESIGN DRAWN BY

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DESIGN
R.H.

CHECKED 

DATE

07.02.27

DRAWN BY
 RH

APPROVED

[illegible]**DART**

DRAWING NO.
D2580

02380
TITLE

205 SKIDTUBER

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HAWKESBURY, ONTARIO, CANADA

RE

REV. D

SHEET 3 OF 3

SCALE

SCALE

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

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			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

NOTE: Date & initial all entries

NO. 232

AWS D17.1.2001
QUALIFICATION TEST RECORD

Name: Barclay Elliott
Job number: 58508
Part number: D205 634 041
Description: 205 tube
Welding Process: Tig[☒] Mig[]
Base material: Aluminium
Current: AC[☒] DC[]

TEST REQUIREMENTS AND RESULTS

Visual: pass[☒] fail[]
Penetration: pass[☒] fail[]

UNACCEPTABLE

Cracks: pass[☒] fail[]
Undercut: pass[☒] fail[]
Pin holes: pass[☒] fail[]
Overlap (cold lap): pass[☒] fail[]
Porosity (surface): pass[☒] fail[]
Coloration: pass[☒] fail[]

Qualifier Bob Jones Date of Test Coupon 10.05.18
Welder Barclay Elliott Date of Test Coupon 10.05.18

The above named individual is qualified in accordance with AWS D17.1.2001 to weld